

AMENDED CLAIMS

(Version with Markings To Show Changes Made)

1. (Cancelled)
2. (Withdrawn) The delivery system of claim 1, wherein said delivery means comprises a catheter with a distal end having an opening at said distal end, said delivery means comprising means for delivering said genetic material from said reservoir through said opening, and further comprising: mapping electrode means positioned at said distal portion for carrying out mapping of the patient's heart so as to identify said cardiac location; and conductor means for connecting said mapping electrode means to the proximal end of said catheter.
3. (Withdrawn) The delivery system of claim 1, wherein said supply of genetic material comprises a bolus of conduction protein genetic material selected for the function of enhancing cardiac cell conductivity.
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Cancelled)
12. (Cancelled)
13. (Cancelled)
14. (Cancelled)

15. (Withdrawn) The delivery system of claim 14, wherein said DNA or RNA encodes cardiac gap junction proteins.
16. (Withdrawn)
17. (Withdrawn) The delivery system of claim 1, wherein said genetic material [is]encodes a protein.
18. (Withdrawn) The delivery system of claim 17, wherein said protein is cardiac gap junction protein.
19. (Withdrawn) The delivery system of claim 18, wherein said cardiac gap junction proteins are connexin proteins selected from the group consisting of Cx40, Cx43, and Cx45.
20. (Currently Amended) An implantable delivery system for delivering doses of genetic material to cardiac tissue, comprising:
 - a supply of recombinant nucleic acid vectors encoding a conduction protein selected from the group Cx40, Cx43, and Cx45;
 - a catheter, said catheter having a distal tip portion for engaging the cells of said cardiac tissue and delivering thereto said recombinant nucleic acid vectors;
 - a reservoir means for holding said supply of recombinant nucleic acid vectors; and [providing it to said distal tip portion of said catheter; and]
 - a delivery means for delivering and transfecting or transducing a therapeutically effective amount of said recombinant nucleic acid vectors from said reservoir means through said distal tip portion of said catheter to said cardiac tissue;
 - wherein said [delivery means] catheter additionally comprises a mapping electrode means, a pacing electrode means, and a conductor means for

connecting said mapping electrode means [or] and a pacing electrode means to the proximal end of said catheter; and
wherein said mapping electrode means provides the means of determining the location of said cardiac tissue deficient in connexin expression for transfection or transduction of said cells in said cardiac tissue and wherein said pacing electrode means provides means for testing or controlling the effect of said connexin proteins with a pacemaker.

21. (Cancelled)
22. (Cancelled)
23. (Cancelled)
24. (Cancelled)
25. (Cancelled)
26. (withdrawn) A method of treatment to improve the conductive properties of a localized area of a patient's heart, comprising:
determining at least one localized area of said patient's heart which exhibits ineffective or harmful conductive properties;
selecting a genetic material which improves the conductive properties of cardiac cells in and around said localized area; and
contacting said cardiac cells with a therapeutically effective amount of said genetic material, thereby improving the overall cardiac function of the patient's heart.
27. (withdrawn) The method of claim 26, comprising selecting a genetic material having the property of enhancing conductivity, and contacting cardiac cells of said cardiac area with said genetic material.

28. (withdrawn) The method of claim 26, comprising selecting a genetic material having the property of slowing conductivity, and contacting cells of said localized area with said selected genetic material.
29. (withdrawn) The method of claim 28, comprising contacting cells in the patient's AV nodal tissue.
30. (withdrawn) The method of claim 28, comprising contacting cells in the patient's His tissue and bundle branches.
31. (withdrawn) The method of claim 26, comprising mapping said patient's heart to determine said localized area.
32. (withdrawn) The method of claim 26, comprising selecting said predetermined genetic material from types of DNA and RNA which impart chronic change in conductive properties to said cardiac cells.
33. (withdrawn) The method of claim 32, comprising selecting DNA or RNA of a type which encodes cardiac gap junction proteins.
34. (withdrawn) The method of claim 33, comprising selecting connexin proteins from the group consisting of Cx40, Cx43, and Cx45.
35. (withdrawn) The method of claim 26, comprising selecting protein of a form that imparts acute change in conductive properties to said cardiac cells.
36. (withdrawn) The method of claim 35, comprising selecting a cardiac gap junction protein.
37. (withdrawn) The method of claim 36, comprising selecting said cardiac gap junction protein from the group consisting of Cx40, Cx43, and Cx45.
38. (withdrawn) The method of claim 26, comprising providing an endocardial catheter having a distal injection element, and wherein said contacting comprises positioning said injection element in an area adjacent to said

localized area and releasing said genetic material area through said injection element into said adjacent area.

- 39. (Cancelled)
- 40. (Cancelled)
- 41. (Cancelled)
- 42. (Cancelled)
- 43. (withdrawn) The delivery system of claim 42, wherein said DNA or RNA encodes cardiac gap junction proteins.
- 44. (withdrawn) The delivery system of claim 43, wherein said cardiac gap junction proteins are connexin proteins selected from the group consisting of Cx40, Cx43, and Cx45.
- 45. (withdrawn) The delivery system of claim 6, wherein said genetic material is protein.
- 46. (withdrawn) The delivery system of claim 45, wherein said protein is cardiac gap junction protein.
- 47. (withdrawn) The delivery system of claim 46, wherein said cardiac gap junction proteins are connexin proteins selected from the group consisting of Cx40, Cx43, and Cx45.
- 48. (Cancelled)
- 49. (Cancelled)
- 50. (Cancelled)
- 51. (withdrawn) The delivery system of claim 50, wherein said DNA or RNA encodes cardiac gap junction proteins.
- 52. (withdrawn) The delivery system of claim 51, wherein said cardiac gap junction proteins are connexin proteins selected from the group consisting of Cx40, Cx43, and Cx45.

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53. (withdrawn) The delivery system of claim 10, wherein said genetic material is protein.
54. (withdrawn) The delivery system of claim 53, wherein said protein is cardiac gap junction protein.
55. (withdrawn) The delivery system of claim 54, wherein said cardiac gap junction proteins are connexin proteins selected from the group consisting of Cx40, Cx43, and Cx45.
56. (withdrawn) A method of expressing conduction protein in cardiac tissue comprising delivering an expression vector comprising a nucleotide sequence encoding said conduction protein to said cardiac tissue using the delivery system of claim 1, 6, 10, 20 or 24.
57. (withdrawn) The method of claim 56 wherein said conduction protein is selected from the group consisting of Cx40, Cx43, and Cx45.
58. (withdrawn) The method of claim 57 wherein said expression vector comprises a nucleotide sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, and SEQ ID NO:5.
59. (withdrawn) The method of claim 56 wherein said expression vector is a viral vector.
60. (withdrawn) The method of claim 59 wherein said viral vector is an adenoviral vector.